

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

The Connecticut Light & Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Frost Bridge to Campville 115-kilvolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton, which consists of (a) construction, maintenance and operation of a new 115-kV overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4-mile segment of two existing 115-kV electric transmission lines across the Naugatuck River in the towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV transmission line.

DOCKET NO. 466

March 24, 2016

Applicant's Proposed Findings of Fact

TABLE OF CONTENTS

	<u>PAGE</u>
I. Introduction.....	1
II. Need	3
III. Project Alternatives.....	8
IV. The Proposed Project	11
V. Transmission Line Route and Configuration Alternatives	17
VI. Safety and Security	22
VII. Environmental Resources, Effects, and Mitigation Measures	23
VIII. Electric and Magnetic Fields	34

I. INTRODUCTION

1. Pursuant to Connecticut General Statutes (“CGS”) § 16-50g et seq., on December 23, 2015, The Connecticut Light and Power Company doing business as Eversource Energy (“Eversource”) applied to the Connecticut Siting Council (“Council”) for a Certificate of Environmental Compatibility and Public Need (“Certificate”) for the construction of a new 10.4-mile 115-kilovolt (“kV”) predominantly overhead electric transmission line between its Frost Bridge Substation in the Town of Watertown and its Campville Substation in the Town of Harwinton, related improvements to both substations, and the reconfiguration of a 0.4-mile segment of two existing 115-kV transmission lines that are supported on common structures. These proposed improvements, which will all be located within Eversource’s existing right-of-way (“ROW”) or on Eversource fee-owned property, are referred to collectively as the Frost Bridge to Campville 115-kV Project (“Project”). (Eversource 1, Vol. 1, pp. ES-1, 1-1; Vol. 5)
2. Parties to these proceedings include Eversource (the Applicant) and Office of Consumer Council. (Record)
3. In compliance with CGS § 16-50/(b), Eversource provided service and legal notice of the Application. This included notice to municipalities along the route of the proposed Project, as well as to municipalities within 2,500 feet of the proposed line; federal, state, local and regional agencies, and elected officials. Eversource also published notice in Litchfield County Times on December 11, 2015 and December 18, 2015, Waterbury Republican-American on December 15, 2015 and December 17, 2015, and Torrington Register Citizen on December 15, 2015 and December 19, 2015; and provided a separate “Notice of Proposed Construction of a High-Voltage Electric Transmission Line” that was included in one or more monthly bills to Eversource customers within Watertown, Thomaston, Litchfield, and Harwinton. (Eversource 1, Vol. 1, pp. FR-8 – 10, Affidavits of Notice)
4. Pursuant to CGS § 16-50/(e), in September 2015, Eversource provided a Municipal Consultation Filing (“MCF”) to the Chief Elected Official of each of the affected municipalities and municipalities having a border within 2,500 feet of the proposed facility. The Project route would traverse Watertown, Thomaston, Litchfield, and Harwinton and portions of the Project would be located within 2,500 feet of boundaries of the City of Waterbury and the Town of Plymouth. (Eversource 1, Vol. 1, pp. FR-7, ES-1, ES-10)
5. During the 60-day MCF process, Eversource held two open houses in the project area:
 - September 29, 2015 in Litchfield; and
 - September 30, 2015 in Thomaston.(Eversource 1, Vol. 1, p. ES-11, pp. 9-3 – 9-4)

6. Pursuant to CGS § 16-50l(b), Eversource provided notice to landowners abutting the Frost Bridge Substation in Watertown, Connecticut and the Campville Substation in Harwinton, Connecticut, and to landowners along the transmission line route.. Community organizations and water companies were also provided notice consistent with the Council's Application Guide for Electric and Fuel Transmission Line Facility (Application Guide). (Eversource 1, Vol. 1, pp. FR-9 – 10, 9-3 Affidavits of Notice)
7. Eversource received return receipts from each landowner abutting the Frost Bridge and Campville Substations. (Eversource 2, Q-CSC-019)
8. Pursuant to CGS § 16-50j(g), on January 22, 2016, the following state agencies were requested to submit written comments regarding the proposed Project: Department of Energy and Environmental Protection ("DEEP"); Department of Agriculture ("DOA"); Department of Public Health ("DPH"); Council on Environmental Quality ("CEQ"); Public Utilities Regulatory Authority ("PURA"); Office of Policy and Management ("OPM"); Department of Economic and Community Development ("DECD"); Department of Transportation ("ConnDOT"); Connecticut Airport Authority ("CAA"); Department of Emergency Services and Public Protection ("DESPP"); and State Historic Preservation Office ("SHPO"). The Council sent a second request for additional agency comments on March 2, 2016. (Record)
9. DPH, Drinking Water Section, submitted comments concerning Eversource's application on January 15, 2016. CONNDOT submitted comments concerning Eversource's Application on February 19, 2016. DEEP submitted comments on February 29, 2016. (DPH comments dated January 15, 2016; CONNDOT comments dated February 19, 2016; DEEP Comments dated February 29, 2016)
10. The DEEP comments evaluated the environmental effects of the Project in detail, based in part on a field review of the entire Project corridor that extended over three days. The DEEP evaluation was generally consistent with that presented in the Application, and noted: "The Eversource application is very detailed and comprehensive in terms of project description, justification and description of corridor resources." (DEEP Comments d. February 29, 2016, at 1)
11. The only Council did not receive written comments from any municipality or public official regarding this Project. However, Michael Criss, First Selectman of Harwinton, made a statement at the public comment session, in which he emphasized the need for careful rehabilitation and maintenance of the ROW. (Record, Tr. 3/1/2016 at 94, 95))
12. In accordance with Section IX of the Application Guide, on February 9, 2016, Eversource posted twelve 4-foot by 6-foot signs notifying the public of the Council's public hearing to be held in Litchfield on March 1, 2016. These signs were posted at various locations throughout Watertown, Thomaston, Litchfield, and Harwinton. (Eversource 3, pp. 38-39)
13. The Council held public evidentiary hearings on February 23, 2016 at 2:00 p.m., at the office of the Council, 10 Franklin Square, New Britain, Connecticut; and on March 1,

2016 at 3:30 p.m., at the Northfield Volunteer Fire Company, Catlin Community Room, 12 Knife Shop Road, Litchfield, Connecticut. (Transcript 1, February 23, 2016, 2:00 p.m., p. 4; Transcript 2, March 1, 2016, 3:30 p.m., p. 24)

14. Pursuant to CGS § 16-50m, the Council, after giving due notice thereof, held a public hearing for citizen comment on March 1, 2016, at the Northfield Volunteer Fire Company, Catlin Community Room, Litchfield. The public comment session commenced at approximately 6:30 p.m. (Transcript 3, March 1, 2016, 6:30 p.m., p. 83)
15. The Council and its staff conducted a public field review of the proposed Project route and terminal locations. The public field review was held on March 1, prior to the public hearing. (Council Hearing Notice)

II. NEED

Background (New England Region)

Regional Planning and Reliability

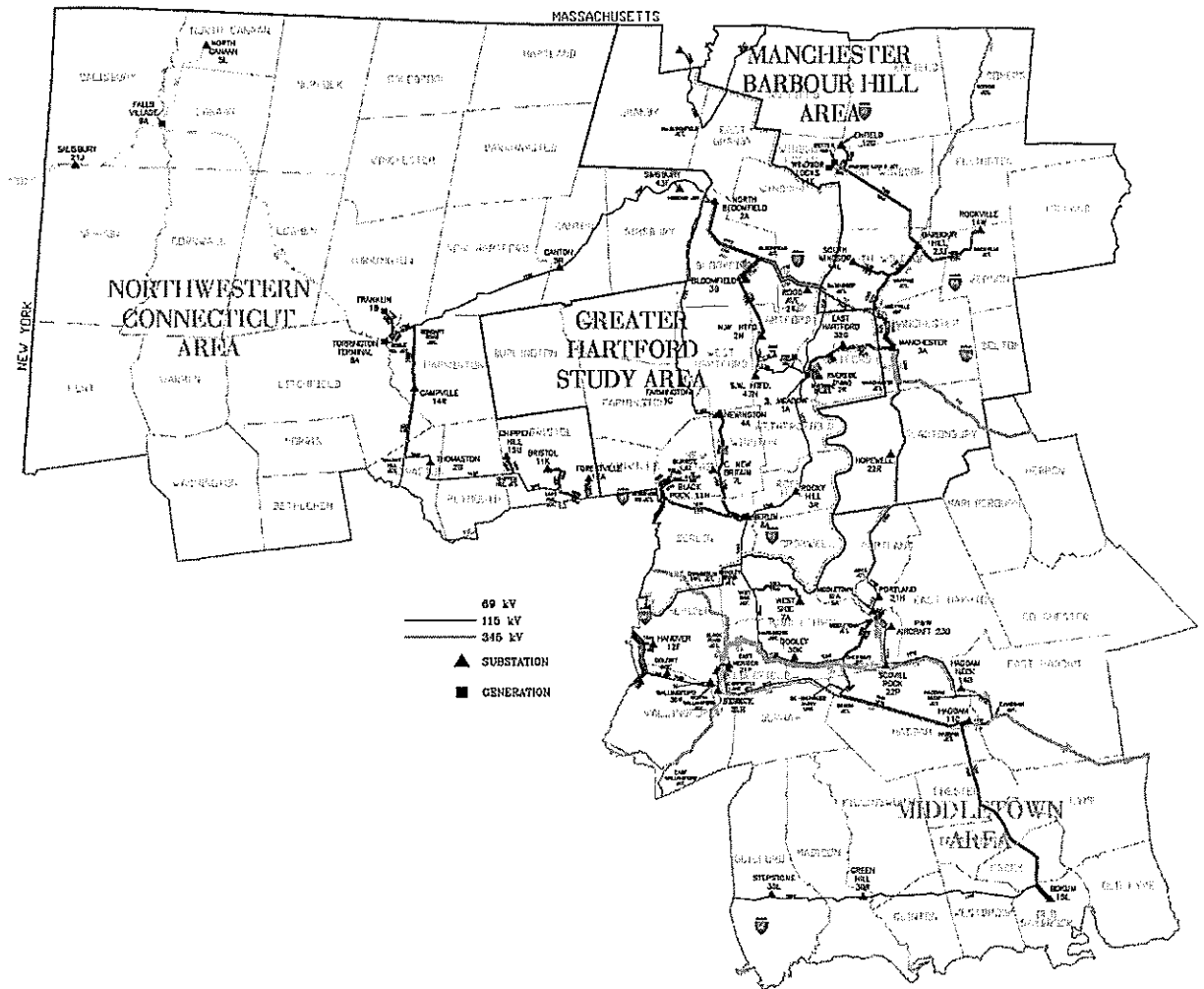
16. Improvements of the electric transmission system that are required to preserve its reliability are planned in a regional process pursuant to federal authority. Pursuant to the Energy Policy Act of 2005, the Federal Energy Regulatory Commission (“FERC”) has designated the National Electric Reliability Corporation (“NERC”) as a national Electric Reliability Organization to develop and enforce reliability standards for planning and operations. NERC’s standards are subject to approval by FERC and compliance is mandatory under federal law. (Eversource 1, Vol. 1, pp. 2-2, 2-3)
17. In addition, the Northeast Power Coordinating Council promulgates reliability criteria that apply in New York, the six New England States, and parts of Canada; these criteria must be consistent with the NERC standards. (Eversource 1, Vol. 1, p. 2-2)
18. In New England, the Independent System Operator – New England (ISO-NE) an independent non-profit entity has been vested by NERC with responsibility for planning and operating the New England transmission grid. ISO-NE issues its own reliability requirements and planning procedures, which must be consistent with (but may be more stringent than) those of NERC and NPCC. (Eversource 1, Vol. 1, p. 2-2)
19. In conducting planning studies and proposing improvements to the transmission system, all transmission owners in New England are required to comply with NERC standards, NPCC criteria, and ISO-NE planning procedures. (Eversource 1, Vol. 1, p. 2-2; Eversource 1, Vol. 4, Exh. 3, p. 6)
20. These standards, criteria, and procedures provide for the identification of the need for improvements to the transmission system by performing planning studies that consist of

computer simulations of the performance of the system under existing and anticipated future conditions. (Eversource 1, Vol. 1, p. 2-3 – 2-6)

Project Development

21. The proposed Project is the product of more than nine years of planning studies. In 2005, ISO-NE identified potential future criteria violations on the 115-kV system in the Greater Hartford area in the course of early studies that ultimately resulted in the New England East-West Solution (“NEEWS”) Plan, a comprehensive set of 345-kV improvements to the Southern New England transmission system in Connecticut, Rhode Island, and Massachusetts. (Eversource 1, Vol. 1, p. 2-6; Eversource 3, pp. 14-15)
22. In early 2010, ISO-NE removed 115-kV issues from the scope of the NEEWS studies and initiated the Greater Hartford Area Reliability Study. In early 2011, the geographical scope of the study area was expanded and the name of the study was changed to the Greater Hartford and Central Connecticut (GHCC) Area Study. The study was combined with other ongoing studies into an assessment of load serving problems in four contiguous sub-areas:
 - Greater Hartford
 - Manchester-Barbour Hill
 - Middletown
 - Northwestern Connecticut (NWCT).(Eversource 1, Vol. 1, pp. 2-6, 2-7; Eversource 3, p. 15)
23. These four sub-areas of the Greater Hartford Central Connecticut study area are illustrated in the Figure below:

GREATER HARTFORD CENTRAL CONNECTICUT STUDY AREA



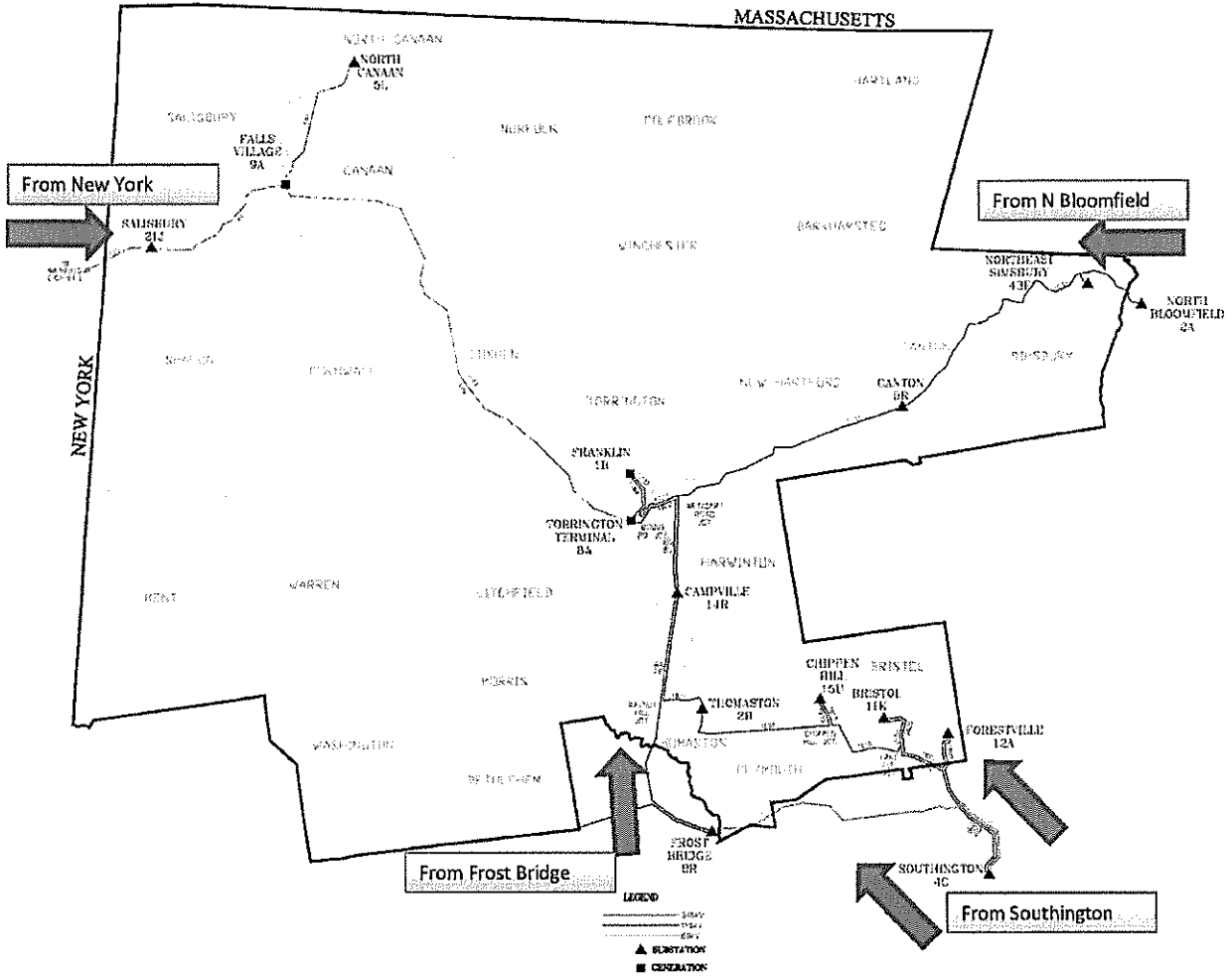
24. To conduct the GHCC study, ISO-NE formed a Working Group consisting of transmission planners from ISO-NE, Eversource, and The United Illuminating Company. (Eversource 1, Vol. 1, p. 2-7; Eversource 3, p. 14)
25. The GHCC studies considered potential interdependencies in the load serving needs and potential solutions for the four sub-areas. The studies ultimately determined that the sub-area solutions could be analyzed independently of one another because the needs in each were largely driven by criteria violations following the loss of critical 115-kV sources into each sub-area. (Eversource 1, Vol. 1, p. 2-8; Eversource 3, p. 15)
26. In 2015, ISO-NE published a report identifying preferred solutions for the needs of the entire Greater Hartford and Central Connecticut study area, including the improvements in the NWCT sub-area proposed in the GHCC Solutions Report. After further detailed

studies and review, and a positive recommendation by its Reliability Committee, ISO-NE issued a technical approval of the preferred GHCC solutions, including the NWCT improvements proposed in this filing, on April 16, 2015. (Eversource 1, Vol. 1, p. 2-8)

Deficiencies

27. The NWCT sub-area is the portion of the state bounded by the Massachusetts and New York state borders, and roughly by State Route 8 to the east and Interstate 84 to the south. It is bordered on the south by the SWCT sub-area. Specifically, SWCT includes the towns of Barkhamsted, Bethlehem, Bristol, Canaan, Colebrook, Cornwall, Goshen, Hartland, Harwinton, Kent, Litchfield, Morris, New Hartford, Norfolk, North Canaan, Plymouth, Salisbury, Sharon, Simsbury, Thomaston, Torrington, Warren, Washington, and Winchester. (The Frost Bridge Substation in Watertown is electrically within the SWCT sub-area.) (Eversource 1, Vol. 1, p. 2-8, 2-9).
28. The following figure is a geographic map of the NWCT sub-area, which shows the existing transmission facilities within the sub-area and, in some cases, line terminations outside of the sub-area:

NORTHWEST CONNECTICUT SUB-AREA



- 29. The GHCC studies showed that there were criteria violations in the NWCT “load pocket.” A load pocket is an area that has insufficient generation and/or transmission to serve its load. Computer simulations showed that the electric system in the NWCT load pocket would be subject to overloads when the system attempted to serve peak load under many contingent conditions. (Eversource 1, Vol. 1, p. 2-10; Eversource 3, p. 15)
- 30. The NWCT sub-area is a net importer of energy and relies on the surrounding areas to serve local load. (Eversource 1, Vol. 4, Ex. 1, p. 14)
- 31. The NWCT sub-area had no N-0 thermal violations, but one 69 kV non-PTF bus had an N-0 base case voltage violation. There were three transmission elements with N-1 thermal violations, and five Pool Transmission Facility (PTF) buses with N-1 violations. Two non-PTF buses had N-1 violations. Under the N-1-1 conditions, there were ten elements with thermal violations and twelve PTF buses with low voltage violations. Two non-PTF buses had N-1-1 voltage violations. (Eversource 1, Vol. 4, Ex. 1, p.14)

32. The worst-case thermal and voltage violations observed were for the loss of two or more import paths into the NWCT sub-area. Although the study year modeled in the “Needs Assessment Report” was 2022, the study showed that the improvements required to meet the identified needs should be constructed as soon as possible. (Eversource 1, Vol. 1, p. 2-12; Eversource 1, Vol. 4, Ex. 1, p. 13; Eversource 3, p. 15)
33. The 2012 Needs Assessment Report had found that the year of need for the NWCT sub-area improvements was 2013, because the Connecticut net load forecast for 2013 was 7,776 megawatts (“MW”); modeled thermal violations began to occur at a net load of 4,225 MW, and modeled low voltage violations began to occur at a net load of 5,694 MW. (Eversource 1, Vol. 1, p. 2-12)

Improvements

34. The major element of the solution recommended by the GHCC studies for the NWCT sub-area was the addition of the proposed new 115-kV overhead line from Frost Bridge Substation to Campville Substation, which also would require the installation of associated terminal equipment. Since the worst thermal and voltage violations were observed for the loss of two sources that feed the NWCT load pocket, a new source into the area was needed. The preferred solution is to build this new 115-kV line, thereby bringing in a new source from a substation just outside the load pocket to the closest substation within the load pocket. (Eversource 1, Vol. 1, p. 2-13; Eversource 1, Vol. 4, Exh. 2, p. 86; Eversource 3, pp. 15-16)
35. The new 115-kV line, to be designated as the 1304 Line, would provide (a) an additional system element to share the load that is automatically redistributed upon the failure of other system elements; and (b) a source to help maintain continuity of supply to the load from external sources in such an event. (Eversource 1, Vol. 1, pp. 1-3, 2-13; Eversource 3, p. 16)
36. The terminal equipment associated with the installation of the new line will include the addition of five new circuit breakers at the Campville Substation, including two pairs in series, in order to eliminate problematic stuck breaker contingencies. (Eversource 1, Vol. 1, p. 2-13)
37. Along the 0.4-mile segment of the ROW at the Naugatuck River crossing, Eversource’s existing ROW is occupied by two 115-kV lines (i.e., existing 1191 and 1921 lines) that are both supported on a single set of lattice steel structures, thus comprising a double-circuit tower (DCT) line. The existing 1191 Line extends along the entire ROW between Frost Bridge and Campville substations, whereas the 1921 Line extends from Thomaston Substation to Campville Substation, following the Frost Bridge to Campville substation ROW for 3.9 miles. Except for the 0.-4 mile DCT segment at the Naugatuck River crossing, these two lines are supported on separate structures. However, because of the DCT segment, the loss of both the 1191 and 1921 lines must be modeled as a single contingency. (Eversource 1, Vol. 1, p. 2-13; Eversource 3, p. 16)

38. The Project accordingly proposes to separate the 1191 and 1921 lines along the 0.4-mile segment at the Naugatuck River crossing to eliminate low voltage conditions and thermal overloads associated with the loss of both lines as currently configured. (Eversource 1, Vol. 1, p. 2-13; Eversource 3, p. 16)
39. Separation of the 1191/1921 DCT segment will result in each line being supported by its own set of structures for its entire length, which, together with the addition of a circuit breaker at the Campville Substation, eliminates these potential overloads. With the addition of the circuit breaker, each of the former DCT lines will be served by its own breaker. (Eversource 1, Vol. 1, p. 2-13, 2-14; Eversource 3, p. 16)
40. The Project is a part of a long-range plan for expansion of Connecticut's power grid. It is a key component of a set of transmission improvements in Connecticut coordinated by ISO-NE that are included in ISO-NE's Regional System Plan, and will ensure compliance with reliability criteria through 2022. (Eversource 1, Vol. 1, p. 2-14; Eversource 3, p. 17)

III. PROJECT ALTERNATIVES

System Alternatives

No Action Alternative

41. One alternative is no action, i.e., no improvement of the electric supply system. The "no action" alternative would not eliminate violations of national and regional liability standards and criteria, and would be inconsistent with Eversource's obligation to provide reliable electric service. (Eversource 1, Vol. 1, p. ES-9; Eversource 3, p. 22)

Transmission Alternatives

42. As part of the GHCC studies, an ISO-NE Working Group comprised of transmission planners from ISO-NE, Eversource, and The United Illuminating Company evaluated transmission alternatives in NWCT. (Eversource 1, Vol. 1, p. 10-1)
43. Having determined that the best way to solve the violations in the NWCT sub-area was to provide a new 115-kV source into it, the Working Group considered what the effective terminal locations of such a line were likely to be. The other terminal location outside the NWCT subarea that was considered was the North Bloomfield Substation, located to the east of the NWCT subarea. The other terminal location within the NWCT subarea that was considered was the Canton Substation. The 115-kV transmission line connections considered as alternatives to the proposed Project were as follows:

- North Bloomfield to Canton; and

- North Bloomfield to Campville.

(Eversource 1, Vol. 1, pp. 10-2, 10-3; Eversource 3, p. 22)

44. The Working Group quickly eliminated the North Bloomfield to Campville transmission system alternative because of its much greater length compared to North Bloomfield to Canton (approximately 25 vs. 12.8 miles), which would make it far more expensive, with more environmental effects. (Eversource 1, Vol. 1, p. 10-4; Eversource 3, p. 22)
45. Eversource conducted an extensive comparison between the proposed Project and the North Bloomfield to Canton alternative in terms of reliability performance, cost, and environmental and social effects. Eversource concluded that the Project was superior to the North Bloomfield to Canton alternative because it (a) provided slightly better system performance in terms of better voltage performance; (b) was approximately \$23 million cheaper; and (c) had lesser environmental and social effects because it was 2.3 miles shorter, traversed through less densely settled areas, and crossed a smaller number of wetlands. (Eversource 1, Vol. 1, pp. 10-4 – 10-6; Eversource 3, pp. 22-23)
46. The following table from the ISO-NE *Solutions Report* shows a comparison of cost estimates between the Proposed Project (designated Alternative A) and the North Bloomfield to Canton alternative (designated Alternative B).

	Solution Component	Cost (\$M)	Included in Alternative A	Included in Alternative B
1	Add a new 10.4-mile, 115 kV-line from Frost Bridge to Campville and associated terminal equipment	45.5	Y	
2	Add a new 12.8-mile, 115-kV line from North Bloomfield to Canton and associated terminal equipment	66.9		Y
3	Separation of 115-kV DCT corresponding to the Frost Bridge to Campville (1191) line and the Thomaston to Campville (1921) line and add a breaker at Campville 115-kV Substation	5.5	Y	
6	Add a 25.2 MVAR capacitor at Campville Substation	7.0		Y
Solution Alternative Totals (\$M)			51.0	73.9

(Eversource 1, Vol. 1, p. 10-5, Tab. 10-2)

Non-Transmission Alternatives

47. Eversource retained London Economics International, LLC (LEI) to prepare a comprehensive analysis of non-transmission alternatives compared to the preferred transmission solution for the NWCT sub-area identified in GHCC's report, which includes the proposed transmission improvements that are part of this Project. (Eversource 1, Vol. 1, p. 10-7, 10-8; Eversource 1, Vol. 4, Exh. 4; Eversource 3, p. 23)
48. The ISO-NE analyses showed that a non-transmission alternative for the NWCT sub-area would require an injection of 48 MW of energy at Torrington Substation and 181 MW of energy at Campville Substation, or commensurate reductions in the loads served at these substations. Based on these analyses, LEI considered what actual supply-side and demand-side resources would be capable of providing these injections/reductions and selected hypothetical, technically feasible non-transmission alternative technologies for cost analysis. (Eversource 1, Vol. 1, p. 10-8; Eversource 1, Vol. 4, Exh. 4, p. 8-9)
49. The mix of supply-side and demand-side technologies considered by LEI included the following:
- Conventional fossil fuel fired generation (natural gas-fired peaking and combined cycle technologies);
 - Large scale renewable generation (solar, wind and fuel cells);
 - Distribution generation (solar);
 - Active demand response (real-time demand response and real-time emergency generation);
 - Passive demand response (such as energy efficient programs); and
 - Energy storage technologies (utility-scale battery technology, flywheels, etc.)
- (Eversource 1, Vol. 4, Exh. 4, p. 9)

50. The table below summarizes the total requirements and technically feasible non-transmission alternative technologies, by substation.

Substations	Torrington	Campville
Requirements at substation (MW)	48	181
NTA Technologies		
Energy Efficiency (MW)	2	10
CCGT (MW)	-	180
Aeroderivative peaker (MW)	54	-

CCGT: Combined-cycle natural gas fueled turbine generator

Aeroderivative peaker: Turbines modeled on turbojet fans

(Eversource 1, Vol. 1, p. 10-9)

51. LEI concluded that the least-cost technically feasible non-transmission alternative solution would be more difficult to implement than a transmission solution, and would be at least twelve times more costly on average for Connecticut ratepayers. (Eversource 1, Vol. 4, Exh. 4, p. 9)

IV. THE PROPOSED PROJECT

52. The Proposed Route traverses approximately 10.4 miles in a general northerly to northeasterly direction, extending between Eversource's existing Frost Bridge to Campville substations following an existing Eversource right-of-way (ROW) and aligned adjacent to an existing 115-kV line, through portions of the towns of Watertown, Thomaston, Litchfield, and Harwinton, in Litchfield County. Along a portion of the route in Watertown, the ROW also includes a 345-kV line. (Eversource 1, Vol. 1, p. ES-1, 5-2)

115-kV Transmission Line

53. Except for a 0.1-mile segment of underground 115-kV cable within and adjacent to the Frost Bridge Substation, the proposed new 115-kV transmission line between Frost Bridge Substation and Campville Substation would be constructed overhead, entirely within an existing Eversource ROW that ranges from 250 to 400 feet in width. (Eversource 1, Vol. 1, p. 1-3; Eversource 3, p. 6, Attachment 1)
54. A 0.1-mile segment of underground cable would be located entirely within the developed portion of the substation or on adjacent Eversource property. (Eversource 1, Vol. 1, p. 1-3, Eversource 3, Attachment 1)
55. The ROW for the new 115-kV transmission line has been devoted to utility use for approximately 90 years. (Eversource 1, Vol. 1, p. ES-1, 1-1, 1-3; Eversource 3, pp. 5-6)

56. The following table summarizes the length of the proposed 115-kV transmission line in each of the four towns along the Proposed Route, and the typical width of the existing Eversource ROW within which the proposed line would be located.

Town	ROW Characteristics	
	Length (Miles)	Width Range (Feet, Typical)
Watertown	0.1 (UG) 0.1 (OH) 4.5	Frost Bridge Substation exit 250 – 400
Thomaston	2.6	250
Litchfield	1.8	250
Harwinton	1.3	250
Total	10.4	

(Eversource 1, Vol. 1, p. 1-4, Table 1-1)

57. Along most of the Proposed Route, the new overhead 115-kV transmission line would be supported on direct embedded monopole structures in a delta or vertical configuration. In certain locations, such as for angle or dead end structures, monopole structures in a vertical configuration on drilled shaft foundations will be used. (Eversource 1, Vol. 1, p. 1-4, 1-5; Eversource 3, p. 7)
58. The new monopole structures would be constructed of weathered steel, with typical structure heights of 90 feet above ground for delta configuration structures and typically 105 feet above ground for vertical configuration, depending on terrain. (Eversource 1, Vol. 1, p. 1-5; Eversource 3, p. 7)
59. Currently, the following transmission lines are located on the ROW. They are supported on various structure types, including double circuit steel monopoles, delta wood laminate monopoles, wood H-frames and lattice steel towers.
- Frost Bridge Substation to Purgatory Junction (Town of Watertown): Line 1238 (115 kV), Line 1191 (115 kV), and Line 352 (345 kV);
 - Purgatory Junction (Town of Watertown) to Walnut Hill Junction (Town of Thomaston): Line 1191;
 - Walnut Hill Junction (Town of Thomaston) to Naugatuck River crossing (Towns of Litchfield and Harwinton): Line 1191 and Line 1921 (115 kV); and

- Naugatuck River crossing (Towns of Litchfield and Harwinton) to Campville Substation (Town of Harwinton): Line 1191 and 1921.

(Eversource 1, Vol. 1, p. 1-4; Eversource 3, pp. 7-8)

60. The existing ROW is sufficiently wide such that the new 115-kV monopoles would be installed without affecting the existing transmission lines, i.e., without requiring the relocation or rebuilding of existing structures. The only exception is within the ROW directly west of Frost Bridge Substation, where an existing lattice tower that presently supports the 1191 Line will be removed and replaced with a steel monopole to make room for an adjacent new structure to support the proposed 1304 Line. (Eversource 1, Vol. 1, p. 1-5; Eversource 3, p. 8)
61. The new 115-kV line would exit the Frost Bridge Substation overhead to a transition structure immediately outside of the substation fence. The line would then transition to an underground configuration for approximately 0.1 mile. This design will minimize conflicts with existing overhead transmission lines and substation equipment at the Frost Bridge Substation. In this area, which is located entirely within Eversource property inside or directly adjacent to the substation fence, the 115-kV line will consist of a cross-linked polyethylene (XLPE) underground cable encased in a concrete duct bank. (Eversource 1, Vol. 1, p. 1-5; Eversource 3, p. 8)
62. Directly outside of the western fence line, the 115-kV underground line will transition to an overhead configuration via a second new transition structure. Along the 2.5-mile segment of ROW from the second new transition structure to Purgatory Hill Junction, the new 115-kV line structures would be aligned near the middle of the existing ROW, between existing 345-kV line (No. 352) and the existing 115-kV (No. 1191) lines. Along the remainder of the Proposed Route (approximately 7.7 miles), the new 115-kV line structures would be aligned east of an existing 115-kV line (i.e., east of the 1191 Line from Purgatory Hill Junction to Walnut Hill Junction, and east of the 1921 Line from Walnut Hill Junction to Campville Junction). (Eversource 1, Vol. 1, pp. 1-5, 3-12; Eversource 3, p. 8)

Double Circuit Separation

63. Within Eversource's existing 250-foot-wide ROW, along a 0.4-mile segment at the Naugatuck River crossing, between the Towns of Litchfield and Harwinton, the two 155-foot-tall lattice steel towers would be removed and the 1191 and 1921 Lines would be placed on separate vertical steel monopoles, each of which would be approximately 155 feet tall. (Eversource 1, Vol. 1, pp. ES-4, 1-5, 2-13; Eversource 3, p. 10)
64. The 1191 Line (between the Frost Bridge and Campville substations) and the 1921 Line (between the Thomaston and Campville substations) would then each be supported on its own set of structures for its entire length, thereby enhancing the reliability of the transmission system through the elimination of the double circuit configuration. (Eversource 1, Vol. 1, 1-5; Eversource 3, p. 10)

Substation Modifications

Frost Bridge Substation

65. Frost Bridge Substation is located in the southeastern portion of the Town of Watertown and occupies approximately 5.7 acres of a 128.5-acre property owned by Eversource. The substation is situated on the central-western portion of the parcel, east of and adjacent to Frost Bridge Road. The Eversource parcel is bordered by Frost Bridge Road and State Route 8 to the west; an active railroad and the Naugatuck River to the east; State Route 262 to the north, and open land and transmission line infrastructure to the south. (Eversource 1, Vol. 1, p. 1-6; Eversource 3, p. 11; Transcript 2, p. 66; DEEP Comments, Feb. 29, 2016, p. 2)
66. The Frost Bridge Substation property was acquired for utility use and the substation has been in operation for decades. Seven 115-kV and two 345-kV transmission lines presently connect to the Frost Bridge Substation. (Eversource 1, Vol. 1, p. 1-6; Eversource 3, p. 11)
67. To interconnect the new 115-kV line to the Frost Bridge Substation, Eversource proposes the following modifications to the substation, which will be located within the existing fenced area:
- Expand the existing one-position 115-kV bay to a two-position bay. The proposed 115-kV line would use an existing, vacant 115-kV transmission line-terminal position. Although a 115-kV line terminal structure exists, there is currently no transmission line exiting the substation in this position. The substation currently has four 115-kV bays, with a total of seven 115-kV lines exiting the substation.
 - Install one new 115-kV circuit breaker and connect the new 115-kV transmission line to the existing vacant terminal structure position.
 - Install one motor-operated disconnect switch, one ground switch, three lightning arrestors, three capacitor-coupled voltage transformers (CCVTs), and one wave trap. Appropriate junction boxes and yard control boxes would be installed and connected to a pre-existing conduit raceway for control cable.

(Eversource 1, Vol. 1, p. 1-6; Eversource 3, pp. 11-12)

Campville Substation

68. Eversource's Campville Substation is located in the southwestern portion of the Town of Harwinton and currently occupies approximately 1.65 acres of a 42.33-acre Eversource property. The Eversource property is bordered by Wildcat Hill Road on the west, Hayden Road on the south, and private property on the north and east. (Eversource 1, Vol. 1, pp. 1-6, 1-7; Eversource 3, p. 12)

69. The substation property was acquired for utility use in 1926, with additional lands acquired in 1928 and 1936. The Campville Substation has been in operation for decades. (Eversource 1, Vol. 1, p. 1-7; Eversource 3, p. 12)
70. As part of the Project, Eversource proposes the following modifications at the Campville Substation:
- Expand the existing ring bus to accommodate five new 115-kV breakers and one new transmission line-terminal position. The expansion would require the demolition of one existing breaker and the connection of the new equipment in its place. A new transmission line terminal structure would be required to connect the new 115-kV transmission line from Frost Bridge Substation to the Campville Substation line position. In addition, another existing breaker would be shifted slightly to allow the installation of one new 115-kV circuit breaker adjacent to the relocated breaker.
 - Install the new 115-kV line terminal structure, which would be approximately 68 feet tall. Install one motor-operated disconnect switch, one ground switch, three lightning arrestors, three CCVTs, and one wave trap. Appropriate junction boxes and yard control boxes would be installed and connected to a new conduit raceway for control cable.
 - Install four 115-kV disconnect switches, approximately 60 feet of aluminum tube conductor, six 115-kV breakers, two 60-foot-tall lightning masts, and steel support structures and foundations for all new equipment.
 - Extend the existing substation ground grid, grade to the extent necessary to manage storm water flows, and install an extension of the substation fence.
 - Install a new substation enclosure to house additional protection and control equipment.
 - Augment the existing protection and control equipment in the existing substation enclosure to accommodate new substation equipment.
- (Eversource 1, Vol. 1, p. 1-7; Eversource 3, pp. 12-13; Eversource 1, Vol. 5, Exh. 3, App. 3B; Transcript 2, pp. 31-32)
71. To accommodate modifications required to interconnect the new 115-kV transmission line, Eversource proposes to expand the fenced area at Campville Substation by approximately 0.4 acre. These modifications would require an extension of the substation fence by approximately 90 feet to the east to enclose the expansion area. The entire expansion area will be located on land currently owned by Eversource. (Eversource 1, Vol. 1, p. 1-7; Eversource 2, Q-CSC-014; Eversource 3, p. 14)

Cost

72. The estimated capital cost for the Project is approximately \$51 million; the transmission line accounts for approximately \$46 million, and substation modifications account for approximately \$5 million. (Eversource 1, Vol. 1, p. 3-23; Eversource 3, p. 17)

73. Unless there are costs incurred to satisfy local requirements, Eversource expects that the costs of the Project will be regionalized. Assuming all costs are so regionalized, Connecticut's electricity customers (not just Eversource customers) would pay approximately 36% of the Project costs. (Eversource 3, p. 17)

Schedule

74. If the Council issues the requested certificate, Project construction is anticipated to commence in the second quarter of 2017 with a scheduled In Service Date ("ISD") of June 2018 (Eversource 3, p. 17)

Construction Process

Overhead Transmission Line

75. Eversource would construct the proposed Project in several stages, some overlapping in time. The primary activities involved in the construction of the overhead transmission line would include the following:
- Survey and stake the vegetation clearing boundaries and proposed structure locations.
 - Mark the boundaries of previously delineated wetland and watercourse areas, as well as areas to be avoided (e.g., sensitive cultural or environmental resource areas).
 - Establish construction field office(s) and material staging sites (e.g., storage, staging and laydown areas) to support the construction effort. The preferred locations for such areas are typically in the vicinity of the ROW.
 - Perform vegetation clearing along those portions of the ROW to be used for the construction of transmission lines.
 - Install erosion and sedimentation controls in accordance with best management practices.
 - Construct new access roads (and/or improve existing roads) and work pads for structure and conductor installation.
 - Construct foundations and erect/assemble new structures. (At the Frost Bridge Substation exit and at the Naugatuck River, remove the existing lattice steel structures and replace with new monopoles.)
 - Install conductors and shield wires.
 - Restore disturbed sites.
- (Eversource 1, Vol. 1, pp. 4-2 to 4-3; Eversource 3, pp. 23-24)

Underground Transmission Cable

76. The following typical activities will be involved in the construction of the 0.1-mile underground cable system within and adjacent to the Frost Bridge Substation:

- Conduct pre-construction surveys to identify underground facilities along the cable system route, as well as to characterize soil and groundwater conditions.
 - Survey and mark the cable system route.
 - Establish material staging locations.
 - Establish erosion and sedimentation controls, if necessary, at work sites where earth will be disturbed or spoil will be temporarily stored.
 - Install construction work zone signs and implement other traffic control procedures, as needed, along Frost Bridge Road.
 - Excavate for and install the splice vault.
 - Excavate a trench for the cable conduits for the underground section.
 - Install the conduits.
 - Encase the conduits in concrete.
 - Backfill the trench with excavated spoils and/or a concrete-like substance known as a fluidized thermal backfill (FTB) and repave disturbed areas.
 - Pull the cables within the splice vault.
 - Terminate the cables on the transition structures.
 - Stabilize areas affected by construction, using gravel (within the substation) or seeding (outside the substation), as necessary.
- (Eversource 1, Vol. 1, pp. 4-23 – 4-24; Eversource 3, p. 24)

Substation Modifications

77. The following typical activities are expected to be used in modifying the existing Frost Bridge and Campville Substations:

- Site preparation procedures, which may include establishment of construction offices and material staging sites, removal of minimal vegetation from work areas, creation of temporary access to the sites for heavy equipment, and the installation of protective fencing.
- Installation of foundations and equipment.
- Testing of all installations.
- Final cleanup, site security, and landscaping.

V. TRANSMISSION LINE ROUTE AND CONFIGURATION ALTERNATIVES

78. After a new 115-kV circuit between Frost Bridge and Campville substations was selected as the preferred transmission system solution, Eversource identified and evaluated potential routes and configurations for the new line. Both overhead and underground transmission line designs were evaluated, with potential alignments along various existing ROWs and “greenfield” corridors. All route alternatives were evaluated against standard Eversource objectives and criteria for overhead and underground transmission lines. (Eversource 1, Vol. 1, p. ES-9, 11-2)

79. When identifying and comparing potential routes for the new 115-kV line between Frost Bridge Substation and Campville Substation, Eversource considered the following goals:

- The selection of a cost-effective and technically feasible solution to achieve the required transmission system reliability improvements and to interconnect the specified substations; and
 - The avoidance, minimization, or mitigation of adverse environmental and cultural effects and minimizing impacts to the community to the extent possible.
- (Eversource 1, Vol. 1, p. 11-1)

Overview of Route Analysis Process

80. As the first step in the alternative route analyses, Eversource reviewed the general region between Frost Bridge Substation and Campville Substation to identify major, geographically distinct, existing linear corridors (e.g., railroad, road, pipeline, transmission line ROWs) for further investigation. The Project region was also reviewed to determine the potential viability of new “greenfield” routes for the transmission line. (Eversource 1, Vol. 1, pp. 11-2 – 11-3)
81. Eversource identified and reviewed various existing linear corridors to determine if the new 115-kV line could be co-located within or adjacent to such ROWs. Eversource also assessed regional topographic and land use conditions to determine whether a new 115-kV transmission line could be practically developed along an entirely new ROW. (Eversource 1, Vol. 1, p. 11-3)
82. Eversource evaluated each potential route alternative using an established set of criteria for overhead transmission lines and underground transmission cable systems. As a result of these route evaluations, most of the alternatives were found to be impractical because of overriding environmental issues, lack of easements or available property, engineering constraints, and or/cost factors, or were determined to be infeasible after field reconnaissance and closer investigation of potential environmental, social, and cultural effects, engineering concerns, or costs. (Eversource 1, Vol. 1, p. 11-3)

Underground Line Route Alternatives

83. Eversource identified and reviewed several underground cable-route alternatives to interconnect Frost Bridge Substation and Campville Substation. After considering constructability, cost, and environmental factors, most of the “all-underground” cable-system options initially identified were quickly eliminated due to significant cost, constructability, and environmental issues. (Eversource 1, Vol. 1, pp. 11-17 – 11-18)
84. Two potential underground cable routes were further reviewed between Frost Bridge and Campville Substations: (a) an “all underground” cable system along state and local roads; and (b) a variation of the “all-underground” route, which also would include a segment of overhead line within Eversource’s existing ROW between Campville Road in Litchfield and the Campville Substation. (Eversource 1, p. 11-18; Eversource 3, pp. 19-20)

85. Eversource determined that use of either of these underground line routes would be less reliable than the proposed overhead 115-kV transmission line, would be significantly more costly (\$328 million and \$264 million, respectively, compared to an estimated cost of \$51 million for the Proposed Route), and would pose environmental and engineering issues. Either route would also add an estimated six to 12 months to the construction period. (Eversource 1, p. 11-18; Eversource 3, pp. 19-20)
86. In accordance with the Council's "Life-Cycle Cost Studies for Overhead and Underground Transmission Lines" (2012), Eversource performed a present-value analysis of capital and operating costs over the economic life of the Project, as compared to those of the all-underground alternative. It determined the life-cycle cost for the proposed Project is approximately \$76 million, whereas that of the all-underground alternative is approximately \$432 million. (Eversource 1, Vol. 1, pp. 3-23,)

Alternative Overhead Line Routes Considered and Eliminated

87. In addition to the alignment of the new 115-kV transmission line within the existing ROW between Frost Bridge and Campville Substations, Eversource identified and reviewed a number of overhead transmission line-route options. These included the development of the new 115-kV line on a new ROW and within or adjacent to existing linear corridors in the Project region, including State Routes 8, 848, 254, 807, 262, and 109; local roads; and the Naugatuck Railroad Company railroad corridor (which is leased from ConnDOT) along the Naugatuck River. (Eversource 1, Vol. 1, p. 11-6)
88. All of these potential alternative routes were eliminated from detailed consideration because they were found to be unsuitable for the development of a new transmission line due to factors such as engineering constraints, geographic location, lack of easements or property owned in fee, and/or potential for significant environmental, social, or economic effects. (Eversource 1, Vol. 1, p. 11-6)

Overhead Line Route Variations: Frost Bridge Substation Exit

89. Except for the portion of the route near Frost Bridge Substation, the proposed new transmission line would be entirely within an existing Eversource ROW that has been devoted to utility use and occupied by other overhead transmission lines for many years. For these ROW segments, no viable alignment variations to the Proposed Route were identified because compared to the Proposed Route and overhead line design, any route variation outside the ROW or in an underground configuration would increase environmental impacts, community impacts, and Project costs. (Eversource 1, Vol., 1, p. 12-1)
90. Frost Bridge Substation presently connects to nine overhead transmission lines. As a result, Eversource carefully considered options for extending the new 115-kV line out of the substation, with the objective of avoiding or minimizing conflicts with these existing lines, as well as with existing and proposed substation facilities. In addition to the

Proposed Route, two variations for the new transmission line exit from Frost Bridge Substation were identified and evaluated, referred to as Frost Bridge Route Variation 1 and Frost Bridge Route Variation 2. (Eversource 1, Vol. 1, pp. 12-1 to 12-3)

91. As described further below, compared to either Variation 1 or Variation 2, the Proposed Route provides a more direct exit for the new 115-kV line from the Frost Bridge Substation, and avoids the need for any crossings of existing transmission lines. (Eversource 1, Vol. 1, p. 12-5)

Frost Bridge Route Variation 1: All-Overhead Line Design

92. Eversource initially identified an all-overhead exit design, in keeping with the all-overhead plan for the rest of the new 115-kV line. However, in contrast to the other segments of the Project where the new line would be aligned within an Eversource ROW presently occupied by one or more overhead transmission lines, Variation 1 would involve locating the new line along a new route that is not adjacent to any existing transmission lines. (Eversource 1, Vol. 1, p. 12-4)
93. This route variation would place the new 115-kV line on variable terrain upslope of the Naugatuck Railroad and the Naugatuck River, and would require the new transmission line to cross Eversource's existing transmission lines that interconnect Frost Bridge Substation on the east. (Eversource 1, Vol. 1, p. 12-4)
94. This overhead line design was included in the MCF as part of the then-Proposed Route with the caveat that Eversource was performing additional engineering and constructability analyses of undergrounding the portion of the new 115-kV line within and near the Frost Bridge Substation. (Eversource 1, Vol. 1, p. 12-4)
95. Based on the results of its further analyses, Eversource determined that the constructability and environmental issues associated with Variation 1 could be avoided by the adoption of the underground cable/overhead configuration that has been incorporated in the Proposed Route. (Eversource 1, Vol. 1, p. 12-4)

Frost Bridge Route Variation 2: North Underground Exit from Substation to Overhead

96. Similar to the Proposed Route, Variation 2 would involve a short underground 115-kV transmission cable segment within the Frost Bridge Substation, as well as an overhead configuration. (Eversource 1, Vol. 1, p. 12-5)
97. Variation 2 would exit the substation in overhead configuration to a new transition structure immediately outside of the substation fence. The line would then transition to an underground cable configuration and traverse through the substation for approximately 0.1 mile to another new transition structure located outside of the northern portion of the substation fence. The line would then transition back to an overhead configuration and extend west across Frost Bridge Road, State Route 8, and Echo Lake Road before reconnecting to the Proposed Route at new Structure 3. From the transition structure, the

overhead portion of Variation 2 would follow the same alignment as the western portion of Variation 1. (Eversource 1, Vol. 1, p.12-5; DEEP Cmts., Feb. 29, 2016, p. 2)

98. Variation 2 would require five new transmission line structures (including a transition structure). In addition, using this variation, the new 115-kV line would have to cross the existing 352 Line. (Eversource 1, Vol. 1, p. 12-5)

Structure Configuration Alternatives

99. As part of the Project planning process, Eversource evaluated the use of three overhead structure configuration types for the proposed 115-kV transmission line: steel monopoles with either a delta or vertical configuration and steel H-frames. Eversource determined that monopole type structures were preferred rather than H-Frames to facilitate constructability, and because the use of monopoles would require less ROW clearing, less environmental impacts, and would be more cost-effective. (Eversource 1, Vol. 1, p. 12-5; Eversource 3, p. 21)
100. Compared to H-frame structures, monopoles require less new vegetation removal to meet conductor clearance requirements to the edge of the vegetation removal. If H-frames were used instead of monopoles along the Proposed Route, vegetation on an estimated 8.84 additional acres of forestland would have to be removed along the ROW to achieve the required conductor clearances, per utility industry standards. (Eversource 1, Vol. 1, pp. 12-5, 12-9; Eversource 3, p. 21)
101. In addition, along the segment of ROW between Frost Bridge Substation and Purgatory Junction, the use of an H-frame structure design for the currently proposed Project would render the addition of a future line to the ROW not feasible without the acquisition of additional ROW or the rebuild of the H-frame to a monopole. (Eversource 2, Q-CSC-018)
102. The use of H-frames to support the new 115-kV transmission line would pose engineering and constructability challenges, given the extreme slide slopes and steep topography within the Frost Bridge to Campville ROW. This type of rugged terrain presents construction issues associated with installing and leveling the two poles that are required for each H-frame structure. (Eversource 1, Vol. 1, p. 12-9)
103. Delta steel monopoles were selected for use along most portions of the ROW because, compared to vertical steel monopole structures, they are shorter (with a lower visual profile) and more cost-effective to install (shorter embedment depths). However, delta steel monopoles will typically require slightly more forested vegetation removal than vertical steel monopoles. (Eversource 1, Vol. 1, p. 12-5)
104. Along the 400-foot-wide ROW segment from north of Frost Bridge Substation to Purgatory Junction in Watertown, vertical steel monopoles would be installed to optimize the use of the existing ROW, which already is occupied by three other transmission lines. Similarly, in select locations along other segments of the ROW, vertical steel monopoles

are proposed to further minimize environmental impacts (e.g., to avoid a water resource or to minimize clearing within a wetland). (Eversource 1, Vol. 1, p. 12-8)

105. During the MCF public outreach conducted as part of the Council's pre-filing process, landowners and local representatives in Thomaston requested that Eversource evaluate the use of H-frame structures instead of monopoles along a segment of the ROW. The landowners suggested that proposed monopole structures 50-60 be replaced with 11 H-frame structures, which would be shorter and less visible above the adjacent tree line. (Eversource 1, Vol. 1, pp. ES-10, 9-4; Eversource 3, p. 21)
106. After assessing this configuration design alternative, Eversource determined that while the use of H-frames along this segment would be technically feasible, compared to the proposed monopoles, the use of H-frame structures would result in greater environmental impact (approximately 1 acre of additional forest vegetation clearing and disturbance to water resources), and would increase Project costs by approximately \$700,000. Further, a majority of the H-frame structures would still be visible above the tree line. (Eversource 1, Vol. 1, p. 12-11; Eversource 3, pp. 21-22; Davison Direct Testimony March 1, 2016, p. 30)

VI SAFETY AND SECURITY

107. The design of the Project incorporates high-speed protective relaying equipment to automatically detect abnormal system conditions and send a protective trip signal to the associated circuit breaker(s) at each end of a line to isolate the faulted section of the transmission system. (Eversource 1, Vol. 1, p. 4-38; Eversource 3, p. 35)
108. The access driveways to both the Frost Bridge and Campville substations are gated, and the perimeter of each substation is entirely enclosed with a 7-foot high chain-link fence with an additional foot of barbed wire to discourage unauthorized entry and vandalism. (Eversource 1, Vol. 1, p. 4-39)
109. At both the Frost Bridge and Campville substations, smoke detection systems are in place. These systems would automatically activate an alarm at Connecticut Valley Electric Exchange (CONVEX). (Eversource 1, Vol. 1, p. 4-38; Eversource 3, p.35)
110. The physical security of the Frost Bridge and Campville substations is consistent with the Council's "White Paper on the Security of Siting Energy Facilities," as amended. (Eversource 1, Vol. 1, p. 4-39)
111. The construction of the proposed line, the modifications to Frost Bridge and Campville Substations, and the reconfiguration of a short segment of existing 115-kV lines in Litchfield and Harwinton would not pose a safety threat or create any undue hazard to the general public, including persons or property. All work would be designed and constructed in accordance with all applicable national, electric utility industry, state and, to the extent practical, local codes. (Eversource 3, p. 34)

VII. ENVIRONMENTAL RESOURCES, EFFECTS, AND MITIGATION MEASURES

VII.1 Proposed 115-kV Transmission Line and DCT Separation

Geology and Topography

112. Elevations along the Project ROW range from approximately 300 feet in the Town of Watertown to approximately 880 feet in the Town of Litchfield. In general, the topography is hilly with narrow valleys, with local areas of steep and rugged terrain. Along steeply-sloping portions of the ROW in each of the four towns, bedrock is frequently exposed or is within 4 feet of the ground surface. The Project ROW does not traverse any ridgelines or trap rock or amphibolite ridge areas as identified in C.G.S. Section 8-1aaa (1). (Eversource 1, Vol. 1, pp. 5-2 to 5-3)
113. The construction and operation of the new 115-kV transmission would result in minor and localized changes in elevation only in areas where grading and filling are required, such as at structure sites, pulling pads, and guard structure areas or along access roads that must be improved or developed. Grading would not be required, in most instances, where the terrain along the ROW is relatively level, where no access road improvements or new access roads are needed, or where the conductors span the underlying terrain. (Eversource 1, Vol. 1, p. 6-2; Eversource 4, p. 23)
114. During the development of access roads or the installation of some of the proposed steel monopole structures, rock may be encountered. Whereas mechanical methods are the preferred method for removing rock, in some areas, controlled blasting may be required. If blasting is required, Eversource would develop a Blasting Control Plan in compliance with state, industry, and Eversource standards. Potential impacts from rock removal may include dust, vibration, and noise. (Eversource 1, Vol. 1, p. 6-5)

Soils

115. The Project ROW encompasses a variety of different soil types, including poorly drained, very poorly drained, or floodplain soils that qualify as Connecticut wetlands. (Eversource 1, Vol. 1, p. 5-4, Table 5-9, pp. 5-55 to 5-63)
116. All Project activities involving soil disturbance will be performed in accordance with Eversource and state requirements (including Eversource's *2011 Connecticut Best Management Practices Manual* and the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*, as well as the CT DEEP's *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities*). Eversource would prepare Project-specific *Stormwater Pollution Control Plan* that would incorporate these requirements, including specifications for the deployment and maintenance of temporary erosion and sedimentation control measures during construction. (Eversource 1, Vol. 1, p. 6-4, Vol. 6; Eversource 4, pp. 23-24, 37)

117. At locations of earth-disturbing activities, temporary erosion and sedimentation controls (e.g., silt fence, hay or straw bales, water bars, or equivalent) will be installed, maintained, and routinely inspected during construction. Permanent erosion and sedimentation controls, such as sedimentation basins and water bars along permanent access roads, also may be installed as part of access road development or during the course of construction. (Eversource 1, Vol. 1, p. 6-3; Eversource 4, p. 24)

Water Resources

Waterbodies

118. The Proposed Route crosses 58 watercourses (including waterbodies); of these, 20 are perennial streams, rivers, or ponds and 38 are intermittent. All of these watercourses are presently spanned by other existing Eversource transmission lines that occupy the ROW. (Eversource 1, Vol. 1, pp. 5-6 to 5-7; Eversource 4, pp. 14, 25)
119. Along the Proposed ROW, the Naugatuck River is the widest watercourse (110 feet at the ROW crossing); Branch Brook and Northfield Brook are each greater than 20 feet wide. These three watercourses are all part of flood control management areas under the jurisdiction of the USACE. (Eversource 1, Vol. 1, p. 5-6, 5-37 to 5-38; Eversource 4, pp. 14 to 15)
120. The ROW does not cross any watercourses designated as National Wild and Scenic Rivers under the National Wild and Scenic Rivers Act. (Eversource 1, Vol. 1, p. 5-7)
121. The ROW does not cross any watercourses that meet the federal designation as navigable under Section 10 of the Rivers and Harbors Act. (Eversource 1, Vol. 1, p. 5-6; Eversource 4, p. 15)
122. During construction, temporary and in some locations permanent access (i.e., improvements to existing access roads) would be required across smaller streams along the ROW. However, no access will be required across larger watercourses, such as Brank Brook, Northfield Brook, and the Naugatuck River. (Eversource 1, Vol. 1, p. 6-7; Eversource 4, p. 25)
123. Eversource will direct its contractors to use existing access roads, where possible, to cross streams during construction. Where new access roads must be installed or existing access across streams must be improved, temporary and localized effects to water resources (e.g., short-term increases in turbidity, removal of vegetation) will likely occur. Temporary bridges (consisting of timber mats or equivalent) may be used to minimize or avoid direct impacts to stream banks and stream bottom sediments to the extent practical. (Eversource 1, Vol. 1, pp. 6-7 to 6-8; Eversource 4, p. 26).
124. As part of the Project, one existing inadequately-sized culvert will be replaced at a perennial stream crossing (Stream S-F11) along an existing on-ROW access road north of Valley Road in Harwinton. (Eversource 1, Vol. 5, p. 32 of 35; Eversource 4, p. 25)

125. Eversource will implement mitigation measures to minimize the potential effects of construction activities in or near watercourses. Such measures will include adhering to CT DEEP *Stream Crossing Guidelines* and maintaining or selectively cutting riparian vegetation within 25 feet of watercourses, as practical. (Eversource 1, Vol. 1, pp. 4-29 to 4-30, 6-8 to 6-9)

Wetlands

126. The ROW encompasses 91 federal and state jurisdictional wetlands. In addition, four wetlands were delineated along off-ROW access roads that Eversource proposes to use during Project construction. The boundaries of these federal and state jurisdictional wetlands coincide in all but two locations, both along the Naugatuck River floodplain (wetlands FB-1 [Watertown] and F-9 [Litchfield]). The wetlands within this floodplain qualify as state wetlands, but do not meet the criteria for federal jurisdiction. Neither of these state-only wetlands will be affected by the Project. (Eversource 1, Vol. 1, pp. 5-7 and 5-9; Vol 2; Vol. 5, Appendix 2B, pp. 1 and 31 of 35; Eversource 4, p. 15)
127. Because the construction, operation, and maintenance of the new transmission line will not affect the entire width of the existing Eversource ROW, only 48 of the delineated wetlands would be potentially affected by the Project. Of these, only 28 would be affected by temporary or permanent fill as a result of the 115-kV transmission line construction. (Eversource 1, Vol. 1, pp. 6-9; Vol. 5; Eversource 2, CSC-011; Eversource 4, p. 15)
128. The Project would result in an estimated 2.7 acres of temporary fill (timber mats) in wetlands due to construction activities such as new temporary access roads, work pads, vegetation clearing access routes, and guard structures. Approximately 0.04 acre (1,765 square feet) of permanent fill in wetlands would be required due to the location of one new transmission line structure (Structure 95 in Wetland W-F-15 south of Wildcat Hill Road in Harwinton) in a wetland and access road improvements in a wetland associated with a replacement of an existing inadequately-sized culvert along an on-ROW access road north of Valley Road in Harwinton. (Eversource 2, CSC-011; Eversource 4, p. 25)
129. Approximately 6.7 acres of tree clearing will be required in forested wetlands along the Proposed Route. These forested wetlands would be permanently converted to scrub-shrub or emergent wetlands, representing a long-term cover type change to wetland habitat, but not a net loss of wetlands. (Eversource 1, Vol. 1, pp. 6-10, 6-11; Table 6-5, pp. 6-47 to 6-49)
130. As part of the regulatory permitting process for the Project involving the CT DEEP and the USACE, Eversource anticipates that procedures for wetland invasive species control during construction will be developed. Construction activities would conform to these procedures, as well as to the requirements of other federal and state permits regarding water resource crossings. Project-specific plans regarding wetland invasive species control, spill prevention and control, and stormwater pollution control would be prepared

prior to the commencement of construction. (Eversource 1, Vol. 1, p. 4-27 to 4-28, 6-12; Eversource 4, p. 37)

131. To minimize or avoid potential impacts to wetlands, Eversource would require construction activities to conform to the Council's certificate and federal and state permits pertaining to wetlands and to the various mitigation measures identified by the Company. These measures will be incorporated into the Project D&M Plans or similar Project documents. (Eversource 1, Vol. 1, pp. 4-28 to 4-29, 6-12 to 6-13)

Aquifer Protection Areas

132. The Proposed Route does not cross any CT DEEP-designated Aquifer Protection Areas (APAs). The closest APA, Reynolds Bridge, is located approximately 0.48 mile east of the Proposed Route where it crosses Branch Road (State Route 109) near the Watertown / Thomaston boundary. Further, no public wells or private groundwater supplies would be affected by the Project. (Eversource 1, Vol. 1, pp. 5-10 to 5-11, 6-13)

Floodplains

133. As indicated by Federal Emergency Management Agency (FEMA) mapping, the ROW extends across 100-year flood zones associated with Branch Brook in Watertown, Northfield Brook in Thomaston, and the Naugatuck River along the Litchfield/Harwinton town boundary. (Eversource 1, Vol. 1, p. 5-12; Vol. 5, Exhibit 1, Appendix 1B; Exhibit 2, Appendix 2B)
134. No new transmission line structures are proposed within a FEMA-designated 100-year flood zone. (Eversource 1, Vol. 1, p. 6-14; Vol. 5)

Vegetation

135. Eversource's 10.4-mile ROW, which encompasses 370 acres, is characterized by a variety of vegetative habitat types / land uses. Approximately 200 acres of the ROW are either actively managed by Eversource to promote scrub-shrub or other low-maturing vegetative communities or maintained by private landowners in agricultural use or other types of low-growth vegetation. Approximately 132 acres of forested areas are located within the ROW (114 acres consist of deciduous and coniferous forested upland and 18 acres of forested wetlands). (Eversource 1, Vol. 1, pp. 5-12 to 5-13, Vol. 5; Eversource 4, pp. 13, 22)
136. Within the ROW, approximately 48.9 acres of forested vegetation (42.2 acres of upland and 6.7 acres of forested wetland vegetation) will be removed for the Project. Thereafter, Eversource will manage these portions of the ROW in low-growth vegetation, consistent with utility industry standards. (Eversource 1, Vol. 1, p. 6-14 to 6-16; Eversource 4, p. 22)
137. About 7,000 trees with diameter breast heights greater than 5-6 inches will be removed for the Project. However, the resulting conversion of these presently forested areas to

shrubland will have a long-term positive effect on the wildlife species that rely on this habitat for food, cover, and nesting, since shrubland habitat is otherwise declining in New England. In Connecticut, transmission line ROWs are a major source of shrubland habitat. (Eversource 1, Vol. 1, pp. 6-15 to 6-17; Eversource 4, pp. 22, 27)

138. In some areas (e.g., above Branch Brook, Northfield Brook, and the Naugatuck River), where clearance between the new transmission line and the existing tree canopy is adequate, no vegetation removal or tree trimming would be required. (Eversource 1, Vol. 1, pp. 6-15, 6-22)
139. As part of the restoration phase of construction, Eversource would typically seed areas disturbed by work activities. Vegetative species compatible with the use of the ROW for transmission line purposes are expected to regenerate naturally over time. (Eversource 1, Vol. 1, pp. 4-20 to 4-22, 6-17 to 6-18)
140. Eversource would manage the entire ROW in accordance with its well-established vegetation management program. (Eversource 1, Vol. 1, pp. 6-17 to 6-18).

Wildlife and Fisheries

141. The vegetative communities along and in the vicinity of the Eversource ROW provide habitat for a variety of wildlife. (Eversource 1, Vol. 1, pp. 5-14 to 5-15)
142. The Eversource ROW traverses various freshwater watercourses, several of which (e.g., Branch Brook, Northfield Brook, Naugatuck River) support fisheries. (Eversource 1, Vol. 1, pp. 5-15 to 5-16)
143. The results of a breeding bird inventory and assessment that was conducted along the Project ROW in the spring of 2015 indicate that 99 species may potentially breed in the area; of these, 45 were identified during field studies. (Eversource 1, Vol. 1, p. 5-22; Vol. 3, Ex. 2; Eversource 4, p. 9)
144. The development of the new 115-kV transmission line will result in both temporary and permanent alteration of wildlife habitat along the ROW. However, these effects will be localized to the ROW and vicinity and will generally be short-term (during construction) or minor due to the availability of undisturbed habitat types, similar to those found on the ROW, in adjacent areas and in the region as a whole. (Eversource 1, Vol. 1, p. 6-19)
145. The Project will have a long-term beneficial effect on certain wildlife species that use shrubland habitat. (Eversource 1, Vol. 1, p. 6-19)
146. Shrubland and other early-successional birds will benefit from the Project, which will create additional shrubland habitat. Statewide, transmission corridors are critical habitat for bird species that rely on these habitat types. (Eversource 4, p. 27)
147. The Project will not affect fishery resources since the 115-kV transmission line will span all major waterbodies containing fisheries and access across smaller streams would be

designed to avoid or minimize direct disturbance to stream banks and substrates to the extent practical, and would conform to USACE and CT DEEP permit requirements. (Eversource 1, Vol. 1, p. 6-20).

148. Within a 25-foot-wide area adjacent to watercourses, lower-growing riparian vegetation along the ROW would be maintained, where possible, to provide cover and shading for fish. (Eversource 1, Vol. 1, p. 6-20).
149. Above Branch Brook, Northfield Brook, and the Naugatuck River, all of the existing riparian vegetation will remain since the conductor spans will be far above the watercourses. (Eversource 1, Vol. 1, pp. 6-20 to 6-21)

Vernal Pools

150. Vernal pool assessments were performed along the Eversource ROW in the spring of 2015. As a result of these investigations, 22 vernal pools, including four decoy vernal pools, were identified within the Eversource ROW and along publically accessible off-ROW access roads. Subsequent to the completion of the spring 2015 investigations, one of the decoy vernal pools, located within an existing access road, was affected by routine ROW maintenance. Thus, a total of 21 vernal pools (including three decoy vernal pools) are present within the Project area. (Eversource 1, Vol. 1, pp. 5-16 to 5-21; Vol. 3, Ex. 1; Vol. 5, Ex. 2; Eversource 4, p. 16)
151. Of the 21 vernal pools identified during the field studies, 10 are located in whole or in part along portions of the ROW that are presently managed, while another 10 are situated directly adjacent to Eversource's existing on-ROW access roads. Of the 21 vernal pool identified, eight are located within portions of the Project ROW that are not presently incorporated into Eversource's vegetation management program, including two pools located along an existing off-ROW access road in Mattatuck State Forest in the Town of Watertown. (Eversource 1, Vol. 5, Ex. 2; Eversource 4, p. 17)
152. No new transmission line structures would be located in vernal pools. Temporary fill (matting) is proposed in only one vernal pool depression (VP C20-1, a surface-water impoundment located along the edge of an existing access road.) Tree removal will be required in four other vernal pools. (Eversource 1, Vol. 1, p. 6-21, Table 6-6, pp. 6-52 to 6-54, Vol. 5, Ex. 2, p. 14 of 35; Eversource 4, pp. 28 to 29)
153. Mitigation measures, including a variety of best management practices, will be implemented to minimize the potential for impacts to vernal pools during construction. These measures will be further defined in consultation with applicable regulatory agencies, including the Council, CT DEEP, and USACE, and would be incorporated into D&M Plans for the Project. (Eversource 1, Vol. 1, pp. 4-31 to 4-32, 6-21 to 6-22, Table 6-6, pp. 6-52 to 6-54; Eversource 4, pp. 28-29)

Threatened, Endangered, or Special Concern Species

154. The Project is not in the vicinity of any federally-designated threatened or endangered species. Although the northern long-eared bat (a federally- and state-listed endangered species) was initially identified as potentially occurring in proximity to the ROW, consultations with the CT DEEP indicated that there are no known occurrences of the species in the vicinity of the Project. Further, pursuant to the U.S. Fish and Wildlife Service's (USFWS's) January 14, 2016 final 4(d) rule, Eversource evaluated the Project and determined that the Project is excepted from the incidental take prohibitions of the final 4(d) rule. This information is included in the Project's USACE Section 404 permit application. (Eversource 2, CSC-009; Eversource 4, pp. 11 to 12, 17)
155. Based on consultations with CT DEEP followed by wildlife habitat field surveys, five state-listed species were identified as potentially occurring in the vicinity of the Project. These species are: wood turtle, spotted turtle, and smooth green snake (state-listed Special Concern species) and northern spring salamander and frosted elfin butterfly (both state-listed Threatened species). (Eversource 1, Vol. 1, pp. 5-22 to 5-26, Vol. 3, Exhibit 3; Eversource 4, p. 18)
156. Six state-listed bird species also may potentially occur in the Project area: broad-winged Hawk, Brown Thrasher, Savannah Sparrow, Bobolink, and Alder Flycatcher (all state-listed Special Concern species) and American Kestrel (state-listed Threatened species). Eversource 1, Vol. 1, pp. 5-26 to 5-28).
157. Eversource identified measures to minimize potential effects on and to protect the state-listed species. CT DEEP has indicated that if these planned protection strategies are implemented, the Project will not have an adverse impact on these species. (Eversource 1, Vol. 1, pp. 6-27 to 6-33, Vol. 3, Ex. 3; Eversource 4, p. 18; CT DEEP, Letter dated February 29, 2016, p. 2)

Land Use

158. To identify and assess land uses along the ROW, as well as existing and future land use plans and conditions in the Project vicinity, Eversource consulted existing published resources utilizing a geographic information system ("GIS"); analyzed aerial photography and maps; examined state, local, and regional land-use plans (including data concerning federal- and state-designated recreational areas); and reviewed data concerning public and private recreational resources, including CT DEEP's Black Rock State Park and Mattatuck State Forest; the USACE's Black Rock Lake, Northfield Brook Lake, and Thomaston Dam recreational areas; Connecticut Forest and Park Association's ("CFPA"s) blue-blazed trail system, and town recreational areas. Eversource also conducted research to identify whether any parcels preserved by land trusts are located near the Proposed Route. (Eversource 1, Vol. 1, p. 5-29; Eversource 4, pp. 7-8)

159. The Project is not located within the state-designated coastal boundary. (Eversource 4, p. 21)
160. The Project does not traverse any designated wild and scenic or protected rivers, Connecticut Heritage Areas, national scenic or historic trails, ConnDOT scenic land strips, or state- or federally-designated scenic highways. (Eversource 1, Vol. 1, p. 5-29; Eversource 4, p. 21)
161. The new 115-kV transmission facilities will be aligned within a long-established Eversource ROW that traverses or borders a variety of land uses. The ROW extends for approximately 0.94 miles across properties that Eversource owns in fee and for approximately 3.3 miles across public properties on which Eversource has easements for utility use. (Eversource 1, Vol. 1, pp. 5-29 to 5-30; Vol. 5; Eversource 4, p. 19)
162. The ROW extends for approximately 4.7 miles in Watertown, 2.6 miles in Thomaston, 1.8 miles in Litchfield, and 1.3 miles in Harwinton. In each town, land within or adjacent to the ROW typically consist of forestland and shrubland, with some areas of public and private recreational areas and single-family residences. The ROW extends principally through undeveloped or sparsely populated, remote areas that are characterized by segments of rugged terrain. (Eversource 1, Vol. 1, pp. 5-30 to 5-34; Vol. 5, Ex. 1, 2, and 4; Eversource 4, p. 14)
163. At and in the vicinity of the Naugatuck River crossing, where Eversource proposes to separate the existing 1191 and 1921 lines, the ROW is bordered by forest land. (Eversource 1, Vol. 1, p. 5-33; Vol. 5, Ex. 2, Appendix 2B, pp. 30A and 31)
164. The Project will be consistent with existing and future municipal, state, and federal land use plans, as well as with federal guidelines for collocating new transmission lines on existing ROWs. (Eversource 1, Vol. 1, pp. 5-34 to 5-36, 6-34; Eversource 4, p. 29 to 30)
165. The new 115-kV transmission line will be aligned within Eversource's ROW across portions of designated recreational areas, including the Mattatuck State Forest, Veterans Memorial Park, Black Rock State Park, Northfield Brook Lake Recreation Area, areas along the Naugatuck River that are part of the Thomaston Dam Recreation Area, and various hiking trails (i.e., Jericho-Whitestone Connector Trail, Jericho Trail, Mattatuck Trail). (Eversource 1, Vol. 1, pp. 5-37 to 5-40; Vol. 5, Ex. 1 and 2; Eversource 4, pp. 18-20)
166. The new 115-kV transmission line would be consistent with the existing utility use of the ROW that already extends across these recreational areas and thus would not result in significant adverse effects on the public use of such areas. Eversource would coordinate with the owners or managers of the recreational areas to develop measures to maintain public safety during construction, while also avoiding short-term impacts to recreational uses. (Eversource 1, Vol. 1, p. 6-35).

167. The new 115-kV transmission line will not result in impacts to Black Rock State Park or Mattatuck State Forest, which are owned and managed by CT DEEP. (CT DEEP Letter February 29, 2016, pp. 1-2)
168. Eversource will work with landowners and agencies to discourage unwarranted access onto and use of its ROW. (Eversource 1, Vol. 1, pp. 4-21 to 4-22, 6-37)

Designated Protected and Scenic Resources

169. The effects of the Project on designated protected and scenic resources will be incremental because the new 115-kV transmission line would be aligned along an existing ROW (where the existing overhead transmission lines have been part of the landscape for decades) and because, for the most part, views of the new transmission line from designated scenic areas and public recreational areas would be limited as a result of the combination of distance from the ROW, topography, dense vegetative cover, and/or intervening land development. (Eversource 1, Vol. 1, pp. 6-46 to 6-47; Vol. 3, Ex. 5; Eversource 4, pp. 19-20, 30 to 31)
170. The development of the new transmission line would alter views at certain locations, including where the ROW crosses public roads, and the additional vegetation clearing would result in greater visibility of the structures in some locations. However, the proposed 115-kV transmission line would not be apparent as a new dominant landscape element due to the location of the existing ROW and the screening afforded by topography and vegetation. (Eversource 4, p. 31)

Cultural Resources

171. Eversource commissioned cultural resource research and field reconnaissance concerning the Project. The results of these investigations, which are presented in the Preliminary Assessment and Scope of Work for Completion of Cultural Resources Reconnaissance Survey, demonstrated that there are no previously identified historic structures or archaeological sites, or National Register of Historic Places (NRHP) sites in the Project ROW or in the general Project vicinity, but that additional field investigations will be required of certain portions of the ROW to identify and evaluate the potential presence of significant cultural resources. (Eversource 1, Vol. 1, pp. 5-46 to 5-47, Vol. 3, Ex. 4; Eversource 4, pp. 6, 10, 21 to 22)
172. As part of the cultural resource review, Eversource consulted with Connecticut Native American Tribes (i.e., the Mohegans and Mashantucket Pequots) and provided unofficial consultation to the Wampanoags (Aquinnah), a Massachusetts-based tribe. (Eversource 2, CSC-013)
173. Eversource would conform to federal and state regulatory requirements for protecting significant cultural resource sites and would continue to coordinate to that purpose with the State Historic Preservation Office, the USACE, and Native American Tribes. When

more intensive cultural resources field studies are performed to determine the significance of sites, some modifications to construction plans (e.g., work pad dimensions, access road configurations) may be required to avoid or minimize impacts to significant sites or to address potential Native American Tribal concerns. (Eversource 1, Vol. 1, p. 6-39; Eversource, p. 33)

Transportation, Access, and Utility Crossings

174. The Project region is characterized by a well-developed transportation network, consisting of roads, railroads, and airport facilities. No airports are in the immediate vicinity of the ROW. The ROW spans one railroad, located along the west side of the Naugatuck River and owned by ConnDOT; the Railroad Museum of New England operates a heritage railroad (referred to as the Naugatuck Railroad) over portions of this track. (Eversource 1, Vol., 1, pp. 5-42 to 5-42, Vol. 5, Ex. 1 and 2)
175. Construction of the new transmission facilities would cause minor, short-term, and localized effects on transportation patterns as a result of additional construction traffic on local roads. (Eversource 1, Vol. 1, p. 6-38; Eversource 4, p. 32)
176. All roads, and the railroad along the Naugatuck River, would be spanned by the 115-kV conductors. (Eversource 1, Vol. 1, p. 6-38; Eversource 4, p. 32)
177. Eversource would require its construction contractors to employ personnel as necessary to direct traffic at construction work sites where the ROW crosses public roads, as needed, and to erect appropriate traffic signs to indicate the presence of construction work zones. (Eversource 1, Vol. 1, pp. 4-22, 6-38; Eversource 4, p. 32)

Noise and Air Quality

178. Construction of the new transmission facilities would cause localized, short-term, and generally minor increases in ambient noise levels in the immediate vicinity of work sites. Construction contractors would be required to properly maintain vehicles to prevent excessive noise emissions. The operation of the line would not affect the noise environment. (Eversource 1, Vol. 1, p. 6-40; Eversource 4, p. 33)
179. Air-quality effects associated with the construction of the Project would be short-term, minor, and highly localized. No long-term effects on air quality would result from the operation of the new 115-kV line. (Eversource 1, Vol. 1, p. 6-39 to 6-40)
180. To minimize short-term effects to air quality during construction, access roads and other sites will be watered as necessary to suppress fugitive dust emissions, crushed stone aprons would be installed at all access road entrances to public roads, and contractors would be required to properly maintain construction equipment and vehicles and to conform to Connecticut's vehicular anti-idling regulations. (Eversource 1, Vol. 1, p. 6-40).

VII.2 Frost Bridge and Campville Substations

181. Frost Bridge Substation is located in the Naugatuck River Valley, at an elevation of approximately 350 feet, whereas Campville Substation is situated on a west-facing hillside above the Naugatuck River Valley, at an elevation of approximately 760 feet. (Eversource 1, Vol. 1, pp. 5-51, 5-53)
182. Frost Bridge Substation, which is located in the southeastern portion of Watertown east of State Route 8, occupies approximately 5.7 acres of a 128.5-acre site owned by Eversource and zoned for general industrial use. The modifications proposed to connect the new 115-kV transmission line to the substation will be accomplished within the developed (fenced) portion of the site. (Eversource 1, Vol. 1, p. 5-51, 5-52; Eversource 4, p. 13)
183. Campville Substation occupies approximately 1.65 acres of a 42.33-acre Eversource-owned property in a rural area in southwestern Harwinton. For the Project, Eversource proposes to expand the substation to the east by approximately 90 feet (for a total expansion area of approximately 0.4 acre). (Eversource 1, Vol. 1, p. 5-53, 5-54; Eversource 2, CSC-014; Eversource 4, p. 13)
184. The proposed modifications to Frost Bridge and Campville substations would occur in upland areas, which not within any FEMA-designated flood zones. No direct adverse effects on water resources are anticipated. (Eversource 1, Vol. 1, pp. 6-43 to 6-44; Eversource 2, CSC-014)
185. During construction, appropriate temporary soil erosion and sedimentation controls would be installed and maintained, pursuant to Eversource's regulatory approvals and best management practices, to minimize the potential for off-site erosion. Spill prevention and control measures also would be implemented during construction. (Eversource 1, Vol. 1, p. 6-43)
186. The modifications to Frost Bridge Substation will not affect vegetation or wildlife habitat, whereas the minor expansion of Campville Substation will impact approximately 0.4 acre of mixed deciduous forest habitat adjacent to the existing substation fenceline. Given this small habitat loss and the abundance of similar habitat nearby, the substation expansion will not have a long-term adverse impact on biological resources. (Eversource 1, Vol. 1, p. 6-44)
187. The proposed substation modifications will not affect any known state-listed special concern, threatened or endangered species, and will not result in any adverse effects to designated scenic sites or public recreational areas. (Eversource 1, Vol. 1, p. 6-44)
188. Because all construction activities at Frost Bridge Substation and most construction activities at Campville Substation will be within existing fenced areas where soils have been previously disturbed, the potential for encountering intact, significant cultural resources is negligible; consequently, no adverse effects to cultural resources will occur

in these areas. Within the Campville Substation expansion area, Eversource will conduct appropriate investigations to identify whether any cultural artifacts are present and, if so, to appropriately protect or mitigate such materials. (Eversource 1, Vol. 1, p. 6-45)

189. Construction activities associated with the substation modifications will result in localized and short-term increases in noise as a result of work at the stations or due to construction-related traffic on local roads. Most construction activities will be performed during the daytime, Monday through Saturday, between 7:00 AM and 7:00 PM, when human sensitivity to noise is lower. However, under certain circumstances (e.g., during outages), night or weekend construction may be required, involving localized and temporary noise and the use of lights. (Eversource 1, Vol. 1, p. 6-46; Eversource 4, p. 33)

VII.3 D&M Plans and Compliance with Requirements of Other State and Federal Agencies

190. After Council certification of the Project, Eversource will prepare D&M Plans for the Project, consistent with the Council's requirements. Eversource expects to prepare a D&M Plan for the new 115-kV transmission line, as well as a separate D&M Plan for the Frost Bridge and Campville substations. The D&M Plans will include details regarding environmental mitigation measures, and will reflect the incorporation of conditions of the Council's approval. Each D&M Plan will be submitted to the Council for review and approval. (Eversource 4, p. 34)
191. Eversource representatives will monitor the conformance of Project construction activities to the D&M Plans and to other federal and state regulatory requirements. (Eversource 4, p. 34)
192. A permit from the US Army Corps of Engineers, New England District is needed to construct the Project pursuant to Section 404 of the federal Clean Water Act. Eversource must also obtain a Water Quality Certificate from CT DEEP pursuant to Section 401 of the Clean Water Act. (Eversource 1, Vol. 1, pp. 9-1 to 9-2; CT DEEP February 29, 2016 letter, p. 2)
193. Eversource would coordinate with the involved regulatory agencies (e.g., CT DEEP, USACE) to define appropriate compensatory mitigation for the Project's effects on water resources. Eversource anticipates that the in-lieu fee program will be used in order to mitigate for unavoidable Project wetland impacts, as appropriate. (Eversource 4, p. 37)

VIII. ELECTRIC AND MAGNETIC FIELDS

General

194. Transmission lines are common sources of electric and magnetic fields ("EMF"), as are other components of electric power infrastructure. There are no state or federal laws or regulations concerning transmission line EMF. (Eversource 1, Vol. 1, p. 7-4)

195. In February 2014, the Council revised its “Electric and Magnetic Field Best Management Practices for Transmission Lines in Connecticut” (“EMF BMP”), originally issued in 1993. The Council’s EMF BMP addresses concerns regarding potential health risks from exposure to EMF. (Eversource 1, Vol. 1, p. 7-4; Eversource 3, p. 26)
196. Electric fields (“EF”) and magnetic fields (“MF”) are two forms of energy that surround an electrical device. Transmission lines are a source of both EF and MF. (Eversource 1, Vol. 1, pp. 7-1, 7-4)
197. EF are the result of voltages applied to electrical conductors and equipment. EF are measured in units of kilovolts/meter. As the weight of scientific evidence indicates that exposure to EF, beyond levels traditionally established for safety, does not cause adverse health effects, and as safety concerns for EF are sufficiently addressed by adherence to the National Electrical Safety Code, as amended, health concerns regarding EMF focus on MF rather than EF. (Eversource 1, Vol. 1, App. 7A-1)
198. MF are produced by the flow of electric currents. The MF at any point depends on the characteristics of the source, including the arrangement of conductors, the amount of current flow through the source, and the distance between the source and the point of measurement. MF are typically measured in units of milliGauss (mG). (Eversource 1, Vol. 1, App. 7A-1)
199. Although there are no binding regulations limiting EMF exposures, guidelines have been developed by the international scientific community; in particular the International Committee on Electromagnetic Safety (“ICES”), a committee of the Institute of Electrical and Electronics Engineers, and the International Council on Non-Ionizing Radiation Protection (“ICNIRP”), a specially chartered independent scientific organization. ICNIRP established a level of 2,000 mG as an acceptable exposure level for the general public. ICES calculated a guideline of 9,040 mG for exposure to workers and the general public. (Eversource 1, Vol. 1, p. 7-17, App. 7A-3)
200. “Current Status of Research on Extremely Low Frequency Electric and Magnetic Fields and Health: Interstate Reliability Project”, a report by Exponent, Inc., systematically evaluates peer-reviewed research and reviews by scientific panels published from August 1, 2012 to July 31, 2015 to determine if there are new developments that might alter the current scientific consensus as articulated in the Council’s 2014 EMF BMPs. The review concluded that no recent studies provide evidence to alter the conclusion that the research evidence suggests EMF exposure is not the cause of cancer or any other disease process, at the levels we encounter in our everyday environment. (Eversource 1, Vol. 1, p. 7-18; Appendix 7D, pp. 1-2; Eversource 3, pp. 27-28)
201. The Council requires transmission-line planners to provide a baseline design (the Field Management Design Plan) – with cost estimates – against which effective mitigations can be measured. The Council defines “significant reduction” as an approximately 15 percent reduction from baseline MF; and “low cost” as approximately four percent of the

Project’s baseline cost (including related substation work). These guidelines are not absolute and may be varied in appropriate circumstances.. (Eversource 1, Vol. 1, App. 7A-5; EMF Best Management Practices, Council Administrative Notice Item 29, p. 5)

- 202. Spot measurements of EF and MF were taken by Eversource on September 2, 2015 at selected locations along the Proposed Route. The Council’s Application Guide requires measurements of existing EMF at the boundaries of adjacent schools, daycare facilities, playgrounds, hospitals and residential areas. There are no schools, daycare facilities, hospitals and residential areas adjacent to the ROW. (Eversource 1, Vol. 1, ES-8, App. 7B-1; Eversource 3, p. 28)
- 203. The baseball field at Veteran’s Memorial Park in Watertown, which is adjacent to the ROW, qualifies as a playground. Accordingly measurements were taken at the edge of the baseball field closest to the existing transmission line. (Eversource 1, Vol. 1, p. 7-6; Eversource 3, p. 28)
- 204. Measurements of EMF were also taken across the ROW, including at boundaries of adjacent properties, at locations where houses are closest to the ROW, specifically on Walnut Hill Road in Thomaston and on Campville Road in Litchfield. These areas, as well as the Veteran’s Memorial Park baseball field, are referred to as “Focus Areas.” (Eversource 1, Vol. 1, pp. ES-8, 7-6; Eversource 3, pp. 28-29)

Focus Area A: Veteran’s Memorial Park, Watertown

- 205. Veteran’s Memorial Park in Watertown extends into the project ROW; however, the cleared area of the park, where the baseball fields are and where children will congregate, is approximately 300 feet away from the proposed transmission line. (Eversource 1, Vol. 1, p. 7B-2)
- 206. The table below reflects calculated MF levels at Focus Area A, along with a comparison of a post construction underground alternative.

Calculated Magnetic Fields at Focus Area A (Veteran’s Memorial Park)

Distance from Center of Transmission Line to Cleared Area of Baseball Fields at Veteran’s Memorial Park (ft.)	Calculated Magnetic Fields (mG)		
	Existing Conditions	Post Construction	Post Construction of Underground Alternative Outside of ROW
300	2.99	3.05	2.98

(Eversource 1, Vol. 1, App. 7B-3)

- 207. While the MF is slightly higher at Focus Area A with the proposed line as compared to an underground line outside of the ROW, Veteran’s Memorial Park would only see a

reduction of 2.3% with the underground line. This reduction is much less than the target 15% reduction described in the BMPs. (Eversource 1, Vol. 1, App. 7B-3; Transcript 2, p. 65)

Focus Area B: Walnut Hill Road, Thomaston

- 208. Walnut Hill Road in Thomaston extends perpendicular to the ROW where the proposed transmission line would be located. There are 12 residences along a section of approximately 1500 feet of Walnut Hill Road along the Proposed Route. (Eversource 1, Vol. 1, p. 7B-3)
- 209. The table below reflects calculated MF at Focus Area B, along with a comparison of a post construction underground alternative.

Calculated Magnetic Fields at Focus Area B (Walnut Hill Road)

Calculated Magnetic Fields (mG)						
Section	Left Edge of ROW			Right Edge of ROW		
	Existing Conditions	Post Construction	Post Construction of Underground Alternative Outside of ROW	Existing Conditions	Post Construction	Post Construction of Underground Alternative Outside of ROW
Focus Area B (Walnut Hill Road)	7.23	4.23	4.69	6.12	3.92	3.95

(Eversource 1, Vol. 1, p. 7B-4)

- 210. Because of the reduction in MF at both edges of the right-of-way with the proposed transmission line, Eversource does not recommend applying additional MF mitigation measures at this location. (Eversource 1, Vol. 1, App. 7B-4)

Focus Area C: Campville Road, Litchfield

- 211. Campville Road in Litchfield runs perpendicular to the corridor in which the proposed transmission line would reside. There are 19 residences along a section of approximately 3500 feet of Campville Road along the Proposed Route. (Eversource 1, Vol. 1, App. 7B-5)
- 212. The table below reflects calculated MF at Focus Area C, along with a comparison of a post construction underground alternative.

Calculated Magnetic Fields at Focus Area C (Campville Road)

Calculated Magnetic Fields (mG)						
Section	Left Edge of ROW			Right Edge of ROW		
	Existing Conditions	Post Construction	Post Construction of Underground Alternative Outside of ROW	Existing Conditions	Post Construction	Post Construction of Underground Alternative Outside of ROW
Focus Area C (Campville Road)	20.54	12.82	13.28	0.55	1.43	0.42

(Eversource 1, Vol. 1, App. 7B-5)

213. Because the proposed line would lower MF on the west edge of the ROW and would barely increase already low fields on the east edge of the ROW, commensurate with background levels, Eversource does not recommend MF mitigation measures in addition to those incorporated in the baseline design of the transmission line. (Eversource 1, Vol. 1, App. 7B-6)

214. Based on the MF levels resulting from the project’s “no cost” MF reduction measure of optimized phasing, Eversource does not recommend employing additional MF mitigation measures at any of the three Focus Areas. (Eversource 1, Vol. 1, App. 7B-6)

215. Eversource prepared initial calculations of the existing and predicted MF from the transmission lines along the Proposed Route. The calculations most representative of typical conditions are based on projected average annual loading conditions, which were assumed in the calculations. As required by the EMF BMP, loads projected for the year 2019 (the first summer when the new line would be in service) were used for the proposed transmission line. As provided by standard protocols, the calculations apply at 1 meter above grade, and assume that the lowest conductor for each 115-kV circuit is 30 feet above grade and that the 345-kV circuit (within the ROW only between Frost Bridge Substation and Purgatory Junction) is 35 feet above grade. (Eversource 1, Vol. 1, p. 7-9)

216. The calculations confirm that the addition of the new line will not substantially increase EF and MF levels at the edge of the ROW, and will decrease them in some locations, compared to current conditions. (Eversource 1, Vol. 1, p. 7-9)

217. The table below summarizes the calculated MF at the ROW edges before and after the construction of the new line. Each of the three rows of the table relates to a segment of the ROW where the number and/or configuration of the lines on the ROW are different.

Magnetic Field Calculation Summary (Average Annual Loads, field in mG)				
Section	Left Edge of ROW		Right Edge of ROW	
	Pre	Post	Pre	Post
Frost Bridge S/S to Purgatory Junction	23.9	23.5	41.3	40.9
Purgatory Junction to Walnut Hill Junction	7.3	4.2	6.1	3.9
Walnut Hill Junction to Campville S/S	20.5	12.8	0.6	1.4

*Left and right edges of ROW are defined by looking from Frost Bridge Substation to Campville Substation

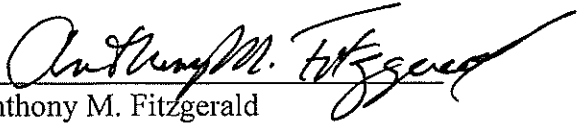
(Eversource 1, Vol. 1, pp. 7-9 – 7-10)

Compliance With Statutory and BMP Requirements

218. Under the EMF BMP guidelines, the Council requires an applicant proposing to build an overhead electric transmission line to develop and present a Field Management Design Plan that identifies design features to mitigate MF that would otherwise occur along an electric transmission ROW, particularly where new certain land uses such as playgrounds, residential areas, schools, and licensed day-care facilities. (Eversource 1, Vol. 1, p. 7-5; Eversource 3, p. 32)
219. In accordance with the Council’s EMF BMP guidelines, the proposed Frost Bridge to Campville 115-kV line has been designed so that it will have very little effect on MF levels within and along the ROW. The Project’s base overhead design incorporates “no cost” MF reduction measures. These measures include arranging the conductors in a compact triangular “delta” configuration and arranging the phases of the new 115-kV line to achieve better cancellation with the MF from the existing transmission lines on the ROW. (Eversource 3, pp. 32-33)
220. Eversource has complied with the statutory and the BMP requirements regarding EMF, as follows:
- Eversource has provided an update of scientific research and authoritative positions concerning potential adverse health effects of MF;
 - Eversource has provided measurements and calculations that were developed in accordance with the BMP; and
 - Eversource has prepared a Field Management Design Plan with a base design that incorporates no-cost design features to mitigate MF that would otherwise occur along an electric transmission ROW.
- (Eversource 1, Vol. 1, p. 7-5; Eversource 3, pp. 32-34)

Respectfully submitted,

THE CONNECTICUT LIGHT AND POWER
COMPANY,

By: 

Anthony M. Fitzgerald
Carmody Torrance Sandak &
Hennessey LLP
195 Church Street, 18th Floor
P.O. Box 1950
New Haven, CT 06509-1950
T: (203) 777-5501

CERTIFICATION

I hereby certify that a copy of the foregoing Applicant's Proposed Findings of Fact has been electronically mailed / sent by U.S. Mail on this 24 day of March, 2016 upon all parties and intervenors as referenced in the Connecticut Siting Council's Service List dated January 21, 2016.


Anthony M. Fitzgerald

Kenneth P. Roberts
Project Manager
Eversource Energy
56 Prospect Street
Hartford, CT 06103
Kenneth.roberts@eversource.com

John Morissette
Project Manager-Transmission
Siting-CT
Eversource Energy
56 Prospect Street
Hartford, CT 06103
John.morissette@eversource.com

Jeffery Cochran, Esq.
Senior Counsel, Legal Dept.
Eversource Energy
107 Selden Street
Berlin, CT 06037
Jeffery.cochran@eversource.com

Anthony M. Fitzgerald, Esq.
Carmody Torrance Sandak &
Hennessey LLP
195 Church Street
New Haven, CT 06509
afitzgerald@carmodylaw.com

Lauren Henault Bidra
Staff Attorney
Office of Consumer Counsel
Ten Franklin Square
New Britain, CT 06051
Lauren.bidra@ct.gov

Richard E. Sobolewski
Supervisor of Technical Analysis
Office of Consumer Counsel
Ten Franklin Square
New Britain, CT 06051
Richard.sobolewski@ct.gov